

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1. (currently amended) A network apparatus that interconnects two or more (=N) basic elements each having the capability to function as one computer, comprising:

N switch device groups each having that each has N switch devices, each of said N switch device groups being electrically configured such that only one of said N switch devices therein is directly connected to one of said basic elements without duplicity, i.e., without selecting the same basic element twice, and first to Nth of the N switch devices are connected in series in the order that a first switch device is connected directly to a basic element, a second switch device is connected to said first switch device, a third switch device is connected to said second switch device and so on up to a final Nth switch device, said Nth switch device being connected to a (N-1) the switch device, and

N loop lines, each being configured by connecting one switch device in each of connected to said N switch device groups, wherein each of said N loop lines is directly connected to only one of said N switch devices that is directly connected

to one of said basic elements in a loop without duplication,  
i.e., without selecting the same device twice.

2. (original) A network apparatus according to claim 1 wherein, if a number  $n$  (where  $1 \leq n \leq N$ ) denotes an  $n$ th switch device, said loop line connects a switch device of each switch device group in a loop such that the switch device numbers increase one by one with progression around the loop line in either a clockwise or counter-clockwise direction and such that the switch device of switch device number  $N$  is connected to the switch device of switch device number 1.

3. (original) A network apparatus according to claim 2 wherein said one of said basic elements and said first switch device, i.e., switch device 1 are bidirectionally connected for input and output of data.

4. (original) A network apparatus according to claim 3 wherein each of the switch devices that constitute said switch device group is unidirectionally connected for one-way transfer of data toward said first switch device.

5. (original) A network apparatus according to claim 4 wherein connections between each of the switch devices that make up said loop lines are bidirectional connections for data transfer.

6. (currently amended) A network apparatus according to  
claim 5 A network apparatus that interconnects two or more (= N)

basic elements each having the capability to function as one computer, comprising:

N switch device groups each having N switch devices,  
each of said N switch device groups being electrically configured  
such that one of said N switch devices is connected to one of  
said basic elements without selecting the same basic element  
twice and first to Nth switch devices are connected in series in  
the order that a first switch device is connected directly to a  
basic element, a second switch device is connected to said first  
switch device, a third switch device is connected to said second  
switch device and so on up to a final Nth switch device, said Nth  
switch device being connected to a (N-1)the switch device, and

N loop lines, each being configured by connecting one  
switch device in each of N switch device groups in a loop without  
selecting the same device twice,

wherein each of the switch devices that constitute each switch device group comprises:

a first port exclusively for receiving data attached with destination information received from an adjacent switch device in the same switch device group;

a second port exclusively for receiving data attached with destination information received from a basic element only when said switch device is directly connected to that basic element;

a third port and a fifth port for both input and output connected to said loop line;

a first and second decoder for judging whether data attached with destination information received from said third port or fifth port, respectively, are communication addressed to a basic element connected to the switch device group concerned or communication addressed to a basic element connected to another switch device group;

a switch unit for, in a case in which it is judged by said first or second decoders that data attached with destination information are addressed to said basic element connected to the switch device group concerned, selecting either that data addressed to the basic element concerned or data attached with destination information that have been received from said first port;

first and second repeaters for, in a case in which it is judged by said first and second decoders, respectively, that data attached with destination information are not addressed to said basic element connected to the switch device group concerned, repeating that data attached with destination information;

first and second selectors for selecting one of: data attached with destination information that have been received from said first and second repeaters and data attached with destination information that are received from said second port,

to send the selected data to said fifth port or third port, respectively; and

a fourth port exclusively for delivering data attached with destination information selected by said switch unit to a switch device adjacent in the direction of the basic element in the switch device group concerned or to the basic element.

7. (original) A network apparatus according to claim 6 wherein first and second selectors of the switch device directly connected to said basic element make a fixed selection of only data attached with destination information that are received from said second port.

8. (original) A network apparatus according to claim 6 wherein first and second selectors of the switch device connected to an adjacent switch device in the same switch device group by way of said fourth port make a fixed selection of only data attached with destination information that have been sent from said first and second repeaters, respectively.

9. (currently amended) A network apparatus that interconnects two or more pairs (= N pairs) of basic elements, each basic element having the capability to function as one computer, comprising:

N switch device groups ~~each having~~ that each has N switch devices, each of said N switch device groups being electrically configured such that[[:] only one of said N switch devices therein is directly connected to one pair of said basic

elements without duplicity, i.e., without selecting the same basic element twice[[;]], and first to Nth switch devices are connected in series in the order that a first switch device is connected directly to a basic element, a second switch device is connected to said first switch device, a third switch device is connected to said second switch device and so on up to a final Nth switch device, said Nth switch device being connected to a (N-1)th switch device, and

N loop transmission paths, each being configured by connecting one switch device in each of connected to said N switch device groups in a loop without duplication, i.e., without selecting the same device twice, wherein each of said N loop transmission paths is directly connected to only one of said N switch devices that is directly connected to one said pair of said basic elements.

10. (original) A network apparatus according to claim 9 wherein, if a number n (where  $1 \leq n \leq N$ ) denotes an nth switch device, said loop transmission path connects a switch device of each switch device group in a loop such that the switch device numbers increase one by one with progression around the loop transmission path in either a clockwise or counter-clockwise direction and such that the switch device of switch device number N is connected to the switch device of switch device number 1; said one pair of said basic elements and said first switch device, i.e., switch device 1 are bidirectionlly connected for

input and output of data; and each of the switch devices that constitute said switch device group is unidirectionally connected for one-way transfer of data toward said first switch device.

11. (currently amended) ~~A network apparatus according to claim 10~~ A network apparatus that interconnects two or more pairs (= N pairs) of basic elements, each basic element having the capability to function as one computer, comprising:

N switch device groups each having N switch devices,  
each of said N switch device groups being electrically configured  
such that: one of said N switch devices is connected to one pair  
of said basic elements without selecting the same basic element  
twice; and first to Nth switch devices are connected in series in  
the order that a first switch device is connected directly to a  
basic element, a second switch device is connected to said first  
switch device, a third switch device is connected to said second  
switch device and so on up to a final Nth switch device, said Nth  
switch device being connected to a (N-1)th switch device, and

N loop transmission paths, each being configured by  
connecting one switch device in each of N switch device groups in  
a loop without selecting the same device twice,

wherein each of said N loop transmission paths is composed of two loop lines, whereby the two basic elements connected to the same switch device group communicate with basic elements connected to other switch device groups through different loop lines of the same loop transmission path.

12. (original) A network apparatus according to claim 11 wherein each switch device comprises a first and second basic switch circuit, and each of the basic switch circuits comprises:

a first port exclusively for receiving data attached with destination information that are sent from an adjacent switch device in the same switch device group;

a second port exclusively for receiving data attached with destination information that are sent from a first or a second basic element of said pair of basic elements only if that switch device is directly connected to said pair of basic elements;

a third port and a fifth port that are connected to said loop transmission path;

a first decoder for judging whether data attached with destination information that have been received from said third port are communication addressed to a basic element that is connected to the switch device group concerned or communication addressed to a basic element that is connected to another switch device group;

a switch unit;

a fourth port for supplying the output of said switch unit to a basic element that is connected to the switch device group concerned; and

a repeater for, in a case in which it is judged by said first decoder that data attached with destination information are

communication addressed to a basic element that is connected to said other switch device group, repeating that data attached with destination information;

    said first and second basic switch circuits each further including a selector and a second decoder; wherein:

        the second decoder of the first basic switch circuit receives, by way of the second port, data attached with destination information from the first basic element that is connected to the second port of the first basic switch circuit and judges whether the data attached with destination information are communication addressed to the second basic element or communication addressed to the basic element that is connected to another switch device group by way of a loop line;

        the second decoder of the second basic switch circuit receives, by way of the second port, data attached with destination information from the second basic element that is connected to the second port of the second basic switch circuit and judges whether the data attached with destination information is communication addressed to the first basic element or communication addressed to the basic element that is connected to another switch device group by way of a loop line;

    the switch unit of the first basic switch circuit receives:

        data attached with destination information that have been received from the first port of the first basic switch

circuit; data attached with destination information that have been received from the third port of the first basic switch circuit when the first decoder of the first basic switch circuit judges that these data attached with destination information are addressed to the first basic element; and data attached with destination information that have been received from the second port of the second basic switch circuit when the second decoder of the second basic switch circuit judges that these data attached with destination information are communication addressed to the first basic element; and selects any of these data attached with destination information, and supplies the selected data to the fourth port of the first basic switch circuit;

the switch unit of the second basic switch circuit receives:

data attached with destination information that have been received from the first port of the second basic switch circuit; data attached with destination information that have been received from the third port of the second basic switch circuit when the first decoder of the second basic switch circuit judges that these data attached with destination information are addressed to second basic element; and data attached with destination information that have been received from the second port of the first basic switch circuit when the second decoder of the first basic switch circuit judges that these data attached with destination information are communication addressed to the

second basic element; and selects any of these data attached with destination information, and supplies the selected data to the fourth port of the second basic switch circuit;

the selector of the first basic switch circuit selects one of:

data attached with destination information that have been received from the second port of the first basic switch circuit when the second decoder of the first basic switch circuit judge that these data attached with destination information are communication addressed to the basic element connected to another switch device group; and output of the repeater of the first basic switch circuit; and supplies the selected data to the fifth port of the first basic switch circuit; and

the selector of the second basic switch circuit selects one of:

data attached with destination information that have been received from the second port of the second basic switch circuit when the second decoder of the second basic switch circuit judges that these data attached with destination information are communication addressed to the basic element connected to another switch device group; and output of the repeater of the second basic switch circuit;

and supplies the selected data to the fifth port of the second basic switch circuit.

13. (original) A network apparatus according to claim 10 wherein each loop transmission path of said N loop transmission paths is composed of one loop line, and two basic elements that are connected to the same switch device group communication with a basic element connected to another switch device group through the same loop line.

14. (original) A network apparatus according to claim 13 wherein each switch device comprises:

first port 1-1 for the first basic element and first port 1-2 for the second basic element, both ports exclusively for receiving data attached with destination information received from an adjacent switch device in the switch device group concerned;

second ports 2-1 and 2-2 exclusively for receiving data attached with destination information that are sent from the first or second basic element, respectively, only when that switch device is connected directly to the basic elements;

a third port and a fifth port connected to an adjacent switch device by way of a loop line;

a first decoder for judging whether data attached with destination information that have been received from said third port are communication addressed to the first basic element, communication addressed to the second basic element, or communication addressed to a basic element that is connected to another switch device group;

a repeater for repeating data attached with destination information when the first decoder has judged that the data attached with destination information are communication addressed to a basic element connected to another switch device group;

a second decoder for judging whether data attached with destination information that have been received from second port 2-1 are communication addressed to the second basic element or communication addressed to a basic element that is connected to another switch device group;

a third decoder for judging whether data attached with destination information that have been received from second port 2-2 are communication addressed to the first basic element or communication addressed to a basic element that is connected to another switch device group;

a first switch for selecting one of data attached with destination information that have been judged by the second decoder to be communication addressed to a basic element that is connected to another switch device group and data attached with destination information that have been judged by the third decoder to be communication addressed to a basic element that is connected to another switch device group;

a selector for selecting one of: data attached with destination information that have been selected by said first switch and data attached with destination information that have

been supplied from said repeater and delivering the selected data by way of the fifth port;

a second switch for selecting one of: data attached with destination information that have been received from first port 1-1; data attached with destination information that have been determined by the first decoder to be communication addressed to the first basic element; and data attached with destination information that have been judged by the second decoder 4-2 to be communication addressed to the first basic element;

a third switch for selecting one of: data attached with destination information that have been received from first port 1-2; data attached with destination information that have been judged by the first decoder to be communication addressed to the second basic element; and data attached with destination information that have been judged by the second decoder to be communication addressed to the second basic element;

fourth port 4-1 for delivering data attached with destination information that have been selected by said second switch to another switch device in the same switch device group or to the first basic element; and

fourth port 4-2 for delivering data attached with destination information that have been selected by said third switch to another switch device in the same switch device group or to the second basic element.

15. (new) A network of N basic elements that each has the capability to function as one computer ( $N \geq 2$ ), the network comprising:

    N switch groups that each has N switches that are connected in series;

    N loop lines that are connected to each of said N switch groups, each of said N loop lines being connected to a different one of said N switches in each of said N switch groups;

    wherein each of the N basic elements is connected to a different one of said N switch groups and is directly connected to only one of said N switches therein, and

    wherein each of said N loop lines is directly connected to only one of said N switches that is directly connected to one of the N basic elements.